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A New Species and Two New Varieties of *Piper* (Piperaceae) from Thailand

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Three new taxa of the Piperaceae, *Piper betloides* A. Chaveerach & A. Tanomtong, *P. pedicellatum* var. *eglandulatum* A. Chaveerach & *P. Mokkamul* and *P. thomsonii* var. *trichostigma* A. Chaveerach & R. Sudmoon are described and illustrated. Morphological differences between the new species and related taxa are also discussed.

Key words: new species, new varieties, *Piper*, Piperaceae, Thailand

The genus *Piper* L. is estimated to consist of over 1000 species, distributed mainly in tropical regions of the world. Several species are of great economic and cultural importance and many species have been used for foods, medicines, stimulants, antiseptics and antioxidants (Picheansoonthon *et al.* 2001). Moreover, their essential oil and leaf extracts possess activities against several bacterium strains and some fungi. We have been concentrating our work on species diversity of this genus in Thailand. Many species have been reported recently (Chaveerach & Picheansoonthon 2004) and some species are in a publication processes. The plant diversity and taxonomy of the Piperaceae in Thailand have not been completed. Taxonomic identifications were investigated based on references available from Aghard (1981), Baker *et al.* (1963), Chaveerach *et al.* (2002), Chaveerach (2003), Chaveerach & Picheansoonthon (2004), Cheng *et al.* (1999), Chew (1972), Gardner (2003), Gilbert (1999), Hara *et al.* (1982), Henderson (1959), Heyne (1987), Ho (1999), Hooker (1885), Huber (1988), Keng (1990), Lin & Lu (1996), Long (1984), Merrill (1912), Ridley (1967), Royen (1982), and Yuncker (1972). Also type specimens were checked from many herbaria. Three new taxa are described and illustrated here.

Piper betloides A. Chaveerach & A. Tanomtong, **sp. nov.** (Fig. 1)

Haec species nova *Piperis betle* L. similis, sed a quo petiolis basi non vaginatis, folii laminis anguste ovatis, ovatis, ellipticis vel oblongis, basi oblique truncatis vel oblique rotundatis, venis e basi 2-paribus et e costis 4-5-paribus exorientibus, et stigmatibus 3-4 pubescentibus differt.

Typus. THAILAND, Northern: Chiang Mai province, Doi Suthep-Pui National Park, altitude of 1100 m, *A. Chaveerach 47* (BK63720) (holo- BK).

Climber, dioecious, fragrant like *P. betle.* Stem slender or stout; node of young branch inflated, 0.5-0.7 cm thick. Petiole not sheathed at base, 1.5-2 cm long. Leaf blade leathery thick, with white glands densely scattered on both surfaces, dark green, nar-

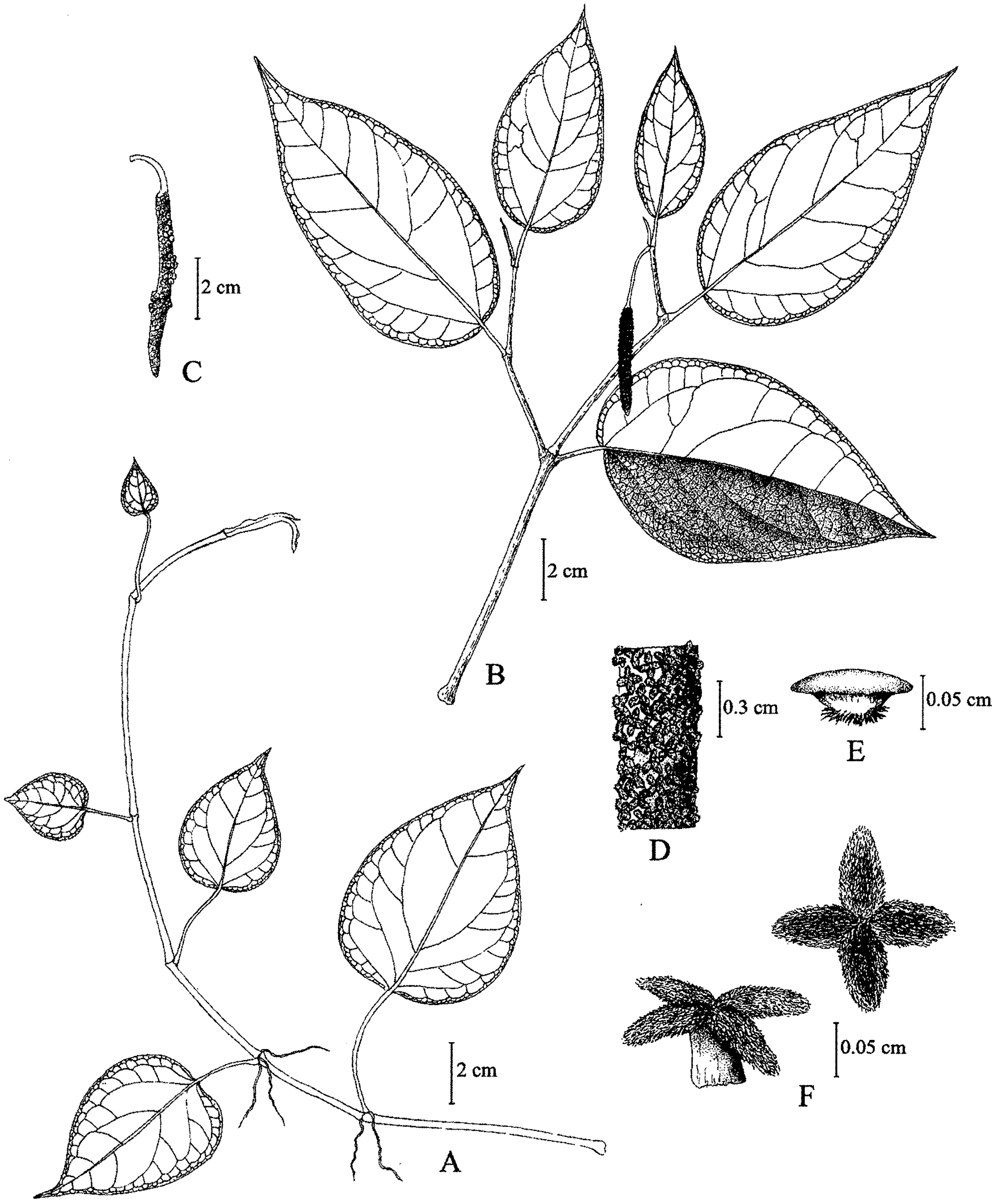

FIG. 1. *Piper betloides* A. Chaveerach & A. Tanomtong. A: leaves toward the base of stem. B: habit with a female spike in anthesis. C: a part of female spike. D: stigmas. E: lateral view of peltate bract. F: infructescence.

rowly ovate to ovate, elliptic or oblong, 11.5-25 cm long, 5.5-17 cm wide; base obliquely truncate or obliquely rounded; apex acuminate; margin entire. Veins abaxially prominent, 2 pairs from the base, 4-5 pairs arisen from the midrib. Male spike unknown. Female spike pendulous, white, 2.5-3 cm long, 0.5-0.7 cm in diameter; peduncle 1.5-2 cm long; bract elliptic, shortly stalked, base pubescent; stigma 3-4, hairy. Drupe globose, loosely interrupted on rachis. Flowering and fruiting on May to June.

Habitat. Hill evergreen forest, and near water fall.

Notes. This species is similar to *P. pendulispicum* C. DC.in leaf shape and leaf color, but more similar to *P. betle* L. in fragrance and female spike characters. *Piper betle* is different from the new species in having the following characters: petioles sheathed at base; leaf blades ovate to ovate oblong, sometimes elliptic, base cordate; veins 7, distal pair arising 0.7-2 cm above base, usually opposite, others basal; stigma 4-5 (6, in Thailand).

Piper pedicellatum C. DC. var. **eglandulatum** A. Chaveerach & P. Mokkamul, **var. nov.** (Fig. 2)

A var. *pedicellato* differt petiolis basi non vaginatis, folii laminis eglandulatis, ellipticis obovatisve, basi unequalis in lateribus 0.5 cm distantis, bracteis stipitibus glabris, et drupis globosis vel obovoideis.

Typus. THAILAND, Northern: Chiang Mai province, Doi Inthanon National Park, at altitude 1700 m, *A. Chaveerach 48* (BK63721) (holo- BK).

Climber, dioecious, much branching, glabrous, pungent. Stem slender to stout, 0.2-0.5 cm thick. Petiole non-sheathed at base, 0.8-1 cm long. Leaf blade thick, undulated by veins, dark green, not glandular, elliptic to obovate, 11-13 cm long, 5-7 cm wide; base unequal in both side 0.5 cm distant; apex acuminate. Veins abaxially prominent, 1-2 pairs basal, 1 pair arising from slightly above the base, distal pairs alternately arising from midrib at 2-4 cm above the base, reticulate veins conspicuous. Male spike unknown. Female spike pendulous, 9-13 cm long, 0.3-0.4 cm in diameter; peduncle 1.5-2 cm long; rachis pubescent; bract orbicular, peltate, distinctively visible, stalk 0.5-1 mm long, glabrous; stigma 3-4. Drupe globose obovoid, 1-1.5 mm. Flowering and fruiting all year round.

Habitat. Hill evergreen forest near water fall.

Notes. P. pedicellatum C. DC. var *pedicellatum* is different from the new variety in having the following characters: petiole sheathed at base; leaf blade finely glandular, ovate, narrowly ovate or elliptic, base oblique, sometimes higher side rounded, bilateral differences ca. 0.2 cm; bract stalk pubescent at base; drupe obovoid, 4-angled.

Piper thomsonii C. DC. var. **trichostigma** A. Chaveerach & R. Sudmoon, **var. nov.** (Fig. 3)

A var. *thomsonii* differt petiolis basi non vaginatis, pedicellis pubescentibus, stigmatibus (3-) 4, drupis globosis laxe interruptis.

Typus. THAILAND, Northern: Mae Hong Son province, the roadside of Mae Sarieng district to Mae Salid district, altitude of 700 m, *A. Chaveerach 49* (BK63719) (holo- BK).

Climber herbaceous, dioecious. Stem slender, glabrous, 0.3-0.5 cm thick. Petiole glabrous, non-sheathed at base, 2-2.5 cm long. Leaf blade membranous to thin papery, with pale brownish, yellowish, or pellucid glandules densely scattered abaxially, sometimes also occurs along veins, finely powdery pubescent along abaxial veins, elliptic, 13.5-17 cm long, 4-7 cm wide; base oblique; apex acuminate. Veins 7-9, 5 basal, 3 alternately arising from midrib at 1-5.5 cm above base, transversely reticulate, reticulation conspicuous. Male spike erect, 5-7.5 cm long, 0.25-0.4 cm in diameter; peduncle 0.5 cm long; bract orbicular, peltate, stalk pubescent, adaxially pellucid glandular scattered; stamens 2, filament slender, anther reniform. Female spike erect, cylindrical, 2-2.5 cm long, 0.4-0.5 cm in diameter; peduncle 0.8-1 cm long; bract as in male spike, stigma (3-)4, pubescent. Drupe globose, loosely interrupted. Flowering and fruiting depend on habitat, on April to June at Mae Hong Son province; on October at Loei province; on December at Nan province.

Habitat. Hill evergreen forest, near water fall, the roadside at high altitude of 700-1200 m.

Notes. P. thomsonii C. DC. var. *thomsonii* is different from the new variety in having the following characters: petiole sheathed at base; stig-

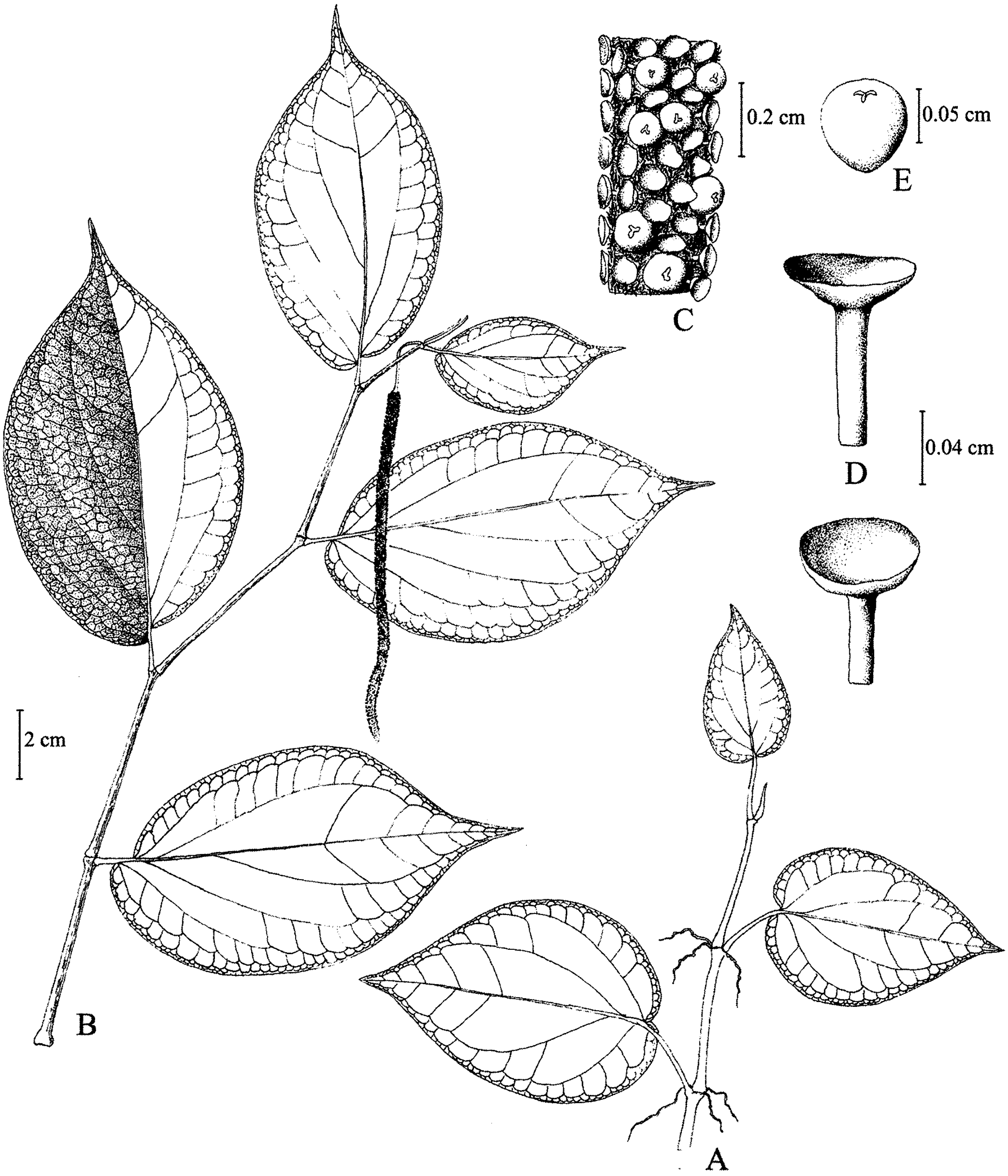

FIG. 2. *Piper pedicellatum* var. *eglandulatum* A. Chaveerach & P. Mokkamul. A: leaves toward the base of stem. B: habit with a female spike in anthesis. C: a part of infructescence. D: peltate bracts. E: fruit.

ma 2, glabrous; bract stalk glabrous, adaxially pubescent; drupe densely arranged on a spike.

Additional specimens observed. Nan province: Doi Phu Ka National Park, altitude of 1200 m, *A. Chaveerach 229* (BK). Tak province: Taksin Maharat National Park, altitude of 900 m, *A. Chaveerach 240* (BK). Loei province: Phu Luang Wildlife Sanctuary, altitude of 900 m, *A. Chaveerch 251* (BK).

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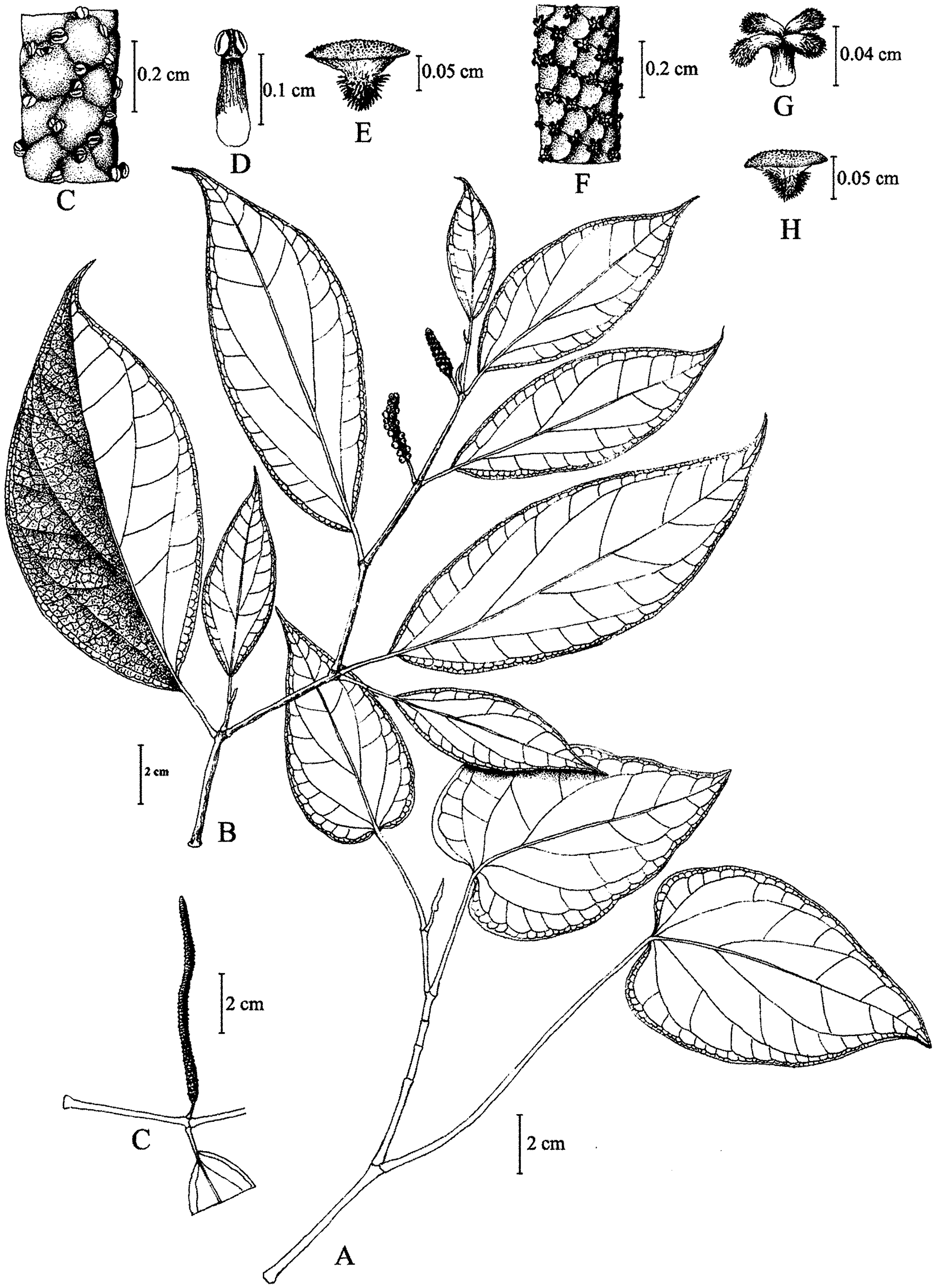

FIG. 3. *Piper thomsonii* var. *trichostigma* A. Chaveerach & R. Sudmoon. A: leaves toward the base of stem. B: leaves toward the apex of stem with fruiting spikes. C: male spike. D: part of female spike. E: stigma. F: lateral view of peltate bract. G: male spike. H: stamen. I: lateral view of peltate bract.

type specimens and exploring original papers.

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